

REPTILIA: TESTUDINES: EMYDIDAE

GRAPTEMYS OUACHITENSIS

Catalogue of American Amphibians and Reptiles.

Vogt, R.C. 1993. *Graptemys ouachitensis*.

***Graptemys ouachitensis* Cagle**
Ouachita Map Turtle

Graptemys pseudogeographica ouachitensis Cagle, 1953:10.
Type-locality, "Ouachita River, four miles northeast of Harrisonburg, Louisiana." Holotype, Univ. Michigan Mus. Zool. (UMMZ) 104345, a mature female, collected by A.H. Chaney and C.L. Smith, 10 June 1950 (examined by author).

Malaclemys pseudogeographica ouachitensis: Cochran and Goin, 1970:149.

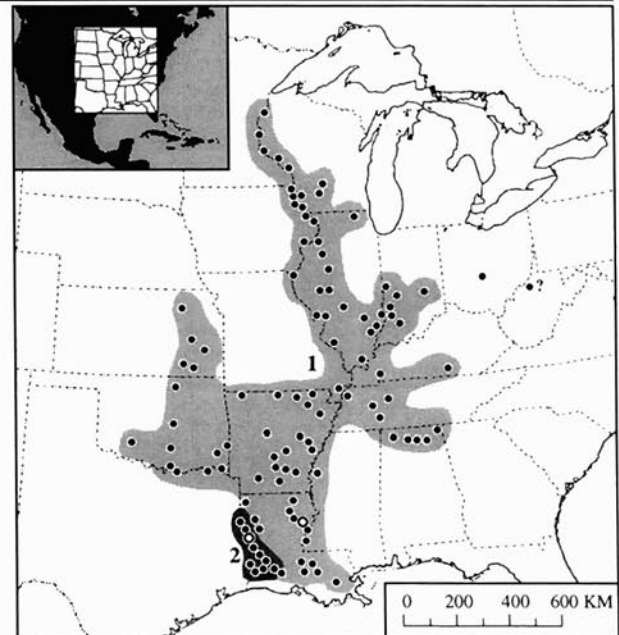
Graptemys ouachitensis: Vogt, 1974:79. First use of combination.

• **Content.** Two subspecies, *Graptemys ouachitensis ouachitensis* and *G. o. sabinensis*, are recognized.

• **Definition.** *Graptemys ouachitensis* is a medium-sized emydid turtle, females reach 260 mm carapace length, males 160 mm. The carapace is elevated, with low black knobs on the second, third, and fourth vertebrals. The carapace is olive-green with one to six, usually one, black blotches on the posterior border of each scute. The blotches are encircled with yellow or orange, or a lattice of interconnected circles may be present without the black blotches. The pattern often fades in adults and melanism is frequent in northern populations. The cream to yellow, flat plastron is marked in hatchlings with dark concentric swirls of alternating yellow and dark green, the green wider than the yellow. This pattern covers less than 75% of the plastron, fades to a brown-yellow mottling in adults and is eventually replaced by dark lines along the sutures. The head is dark green with yellow markings. A large postorbital blotch extends from under the orbit around the posterior border of the eye to meet a pair of longitudinal narrow lines running the length of the head. This postorbital crescent may be broken behind the eye, and 1–9 wide stripes may touch the orbit. The subocular spot is large, and directly below it is another large yellow spot on the lower jaw. Four large yellow spots (one at the symphysis, one on each mandible, and one in the center) or alternating yellow and dark green transverse bars characterize the underside of the head.

• **Diagnosis.** *Graptemys ouachitensis* is distinguished from *G. pseudogeographica* by having a large (broad) postorbital blotch extending from under the orbit (Fig. E) around the posterior border of the eye, and usually meeting a pair of dorsal longitudinal lines running the length of the head (Fig. A). This wide postorbital crescent is often broken behind the eye (Fig. B) with 1–9 wide stripes touching the orbit. The postorbital spot or crescent in *G. pseudogeographica* is always narrow. Directly below the orbit of *G. ouachitensis* is a large yellow spot on the lower jaw (Fig. B, F). Four large yellow spots (one at the symphysis, one on each mandible, and one in the center, Fig. C) or alternating yellow and dark green transverse bars (Fig. I) characterize the underside of the head. In contrast to the extensive plastral pattern in *G. pseudogeographica*, the plastral pattern of *G. ouachitensis* covers less than 75% of the surface area and often is restricted to an area along the scute seams.

• **Descriptions.** Due to the great range in variation of head patterns in *G. ouachitensis* and *G. pseudogeographica*, many of the available descriptions lack clarity or are based on compos-



Map. Circles mark type-localities; other localities verified by the author are designated with dots. The record from West Virginia requires verification (see Distribution) and is indicated with a question mark.

ites of the two species. Cagle (1953), Webb (1961), Anderson (1965), Ernst and Barbour (1972, 1989), Dundee (1974), Vogt (1981a, 1993), Conant and Collins (1991), and Ernst et al. (1994) give adequate descriptions.

• **Illustrations.** Anderson (1965) includes a black and white photograph of *Graptemys geographica* incorrectly labeled *G. pseudogeographica ouachitensis*. In Cochran and Goin (1970) a black and white photograph of *Graptemys ouachitensis* is identified as *Malaclemys p. pseudogeographica*. Cagle (1953) depicts both *G. o. sabinensis* and *G. o. ouachitensis*. Black and white photographs appear in Smith (1956), Webb (1961), Pritchard (1967, 1979), and Ernst and Barbour (1989). Conant (1975) and Conant and Collins (1991) have a colored plate of a female *G. ouachitensis* labeled *G. pseudogeographica*. Ernst and Barbour (1972) present a color photograph of a *G. p. pseudogeographica* female labeled *Graptemys p. ouachitensis*. However, Ernst et al. (1994) has a color photograph of *G. ouachitensis* correctly identified. Line drawings of adult *G. o. ouachitensis* are in Anderson (1965) and Minton (1972). Color illustrations of *G. o. sabinensis* appear in Behler and King (1979) and Dundee and Rossman (1989). Carr (1952) includes a drawing of *G. o. ouachitensis* labeled *G. p. pseudogeographica*. Smith (1956), Webb (1970), Conant (1975), Conant and Collins (1991), and Vogt (1993) have drawings of the lateral view of the head of *G. o. ouachitensis*. In Sowerby and Lear (1872), dorsal and ventral line drawings of *G. o. ouachitensis* are labeled *Emys geographica*.

• **Distribution.** *Graptemys ouachitensis* occurs from the Mississippi and St. Croix rivers in Wisconsin and Minnesota south in the Mississippi River basin through Louisiana. It is found as far west as Lake Texoma, Oklahoma and Texas, and east into Ohio and Kentucky. The only record for West Virginia is based on four adults taken at a single locality (Richmond, 1953); present occurrence needs to be confirmed. Published locality

records are listed for: Alabama (Mount, 1975); Illinois (Smith, 1961); Indiana (Minton, 1972; Ewert, 1979a); Kansas (Clarke, 1956; Clarke et al., 1958; Collins, 1993; Fuselier and Edds, 1994); Louisiana (Cagle, 1953; Dundee and Rossman, 1989); Minnesota (Oldfield and Moriarty, 1994); Mississippi (George et al., 1995); Missouri (Anderson, 1965; Johnson, 1987); Oklahoma (Carpenter, 1955; Webb, 1970; Black et al., 1987); Texas (Harvey, 1992; Dixon, 1987); Wisconsin (Vogt, 1981a); and for the entire range (Iverson, 1992a; Vogt, 1993).

• **Fossil Record.** Wilson and Zug (1966) reported a fossil *Graptemys* from Bay Co., Michigan. It could be either *G. pseudogeographica* or *G. ouachitensis* but because it is out of the present ranges of both species, it is more likely to be *Graptemys geographica* (Holman, 1988). The specimen dates from 4000-6000 BP. Fossil *Graptemys*, possibly assignable to *G. ouachitensis*, were in the Trinity River drainage in Dallas and Denton counties, Texas during the Pleistocene (Sangamon age) (Slaughter et al., 1962) and Henderson County, Texas (Wisconsin age) (Stovall and McNulty, 1950).

• **Pertinent Literature.** Due to the confusion regarding identification of this species, much of the following literature contains unattributable material on both *G. pseudogeographica* and *G. ouachitensis*. General accounts are in Carr (1952) and Ernst and Barbour (1972, 1989). Other papers are listed by topic as follows: shell morphology (Zangerl, 1969); algal relationships (Proctor, 1958; Dixon, 1960); parasites (Ernst and Ernst, 1977, 1979); courtship (Ernst, 1974; Jenkins, 1979); temperature re-

lationships (Hutchison et al., 1966). However, the following papers contain data which apply strictly to *G. o. ouachitensis* or *G. o. sabinensis*. General accounts are in Vogt (1981a) and Ernst et al. (1994). Other papers by topic are: populations (Webb, 1961; Vogt, 1980a; Shively and Jackson, 1985); courtship (Vogt, 1993); commensals (Vogt, 1979); egg predation (Vogt, 1981b); taxonomy (Carr, 1949; Dundee, 1974; Haynes and McKown, 1974; Vogt, 1993; Lamb et al., 1994); karyotype (Forbes, 1966; McKown, 1972; Killebrew, 1977); blood proteins (Sullivan and Riggs, 1967; McKown, 1972; Vogt, 1993); carapacial seams (Tinkle, 1962); trapping (Vogt, 1980b); feeding habits and habitat (Moll, 1976a; Vogt, 1981c; Fuselier and Edds, 1994); growth (Moll, 1976b); longevity (Snider and Bowler, 1992); temperature controlled sex determination (Bull and Vogt, 1979, 1981; Bull et al., 1982a; Bull et al., 1982b; Vogt and Bull, 1982, 1984; Bull, 1985; Bull et al., 1990); eggs and embryology (Ewert, 1979b, 1985; Vogt, 1980a; Congdon et al., 1983; Ewert and Nelson, 1991; Iverson, 1992b); basking behavior (Janzen et al., 1992; Lindeman, 1993).

• **Etymology.** The species is named for the Ouachita River, Louisiana, from which the nominate race was described. The subspecific name *sabinensis* is derived from the Sabine River, Texas and Louisiana, from which the other race was described.

1. *Graptemys ouachitensis ouachitensis* Cagle

Graptemys pseudogeographica ouachitensis Cagle, 1953:10.
See species synonymy.

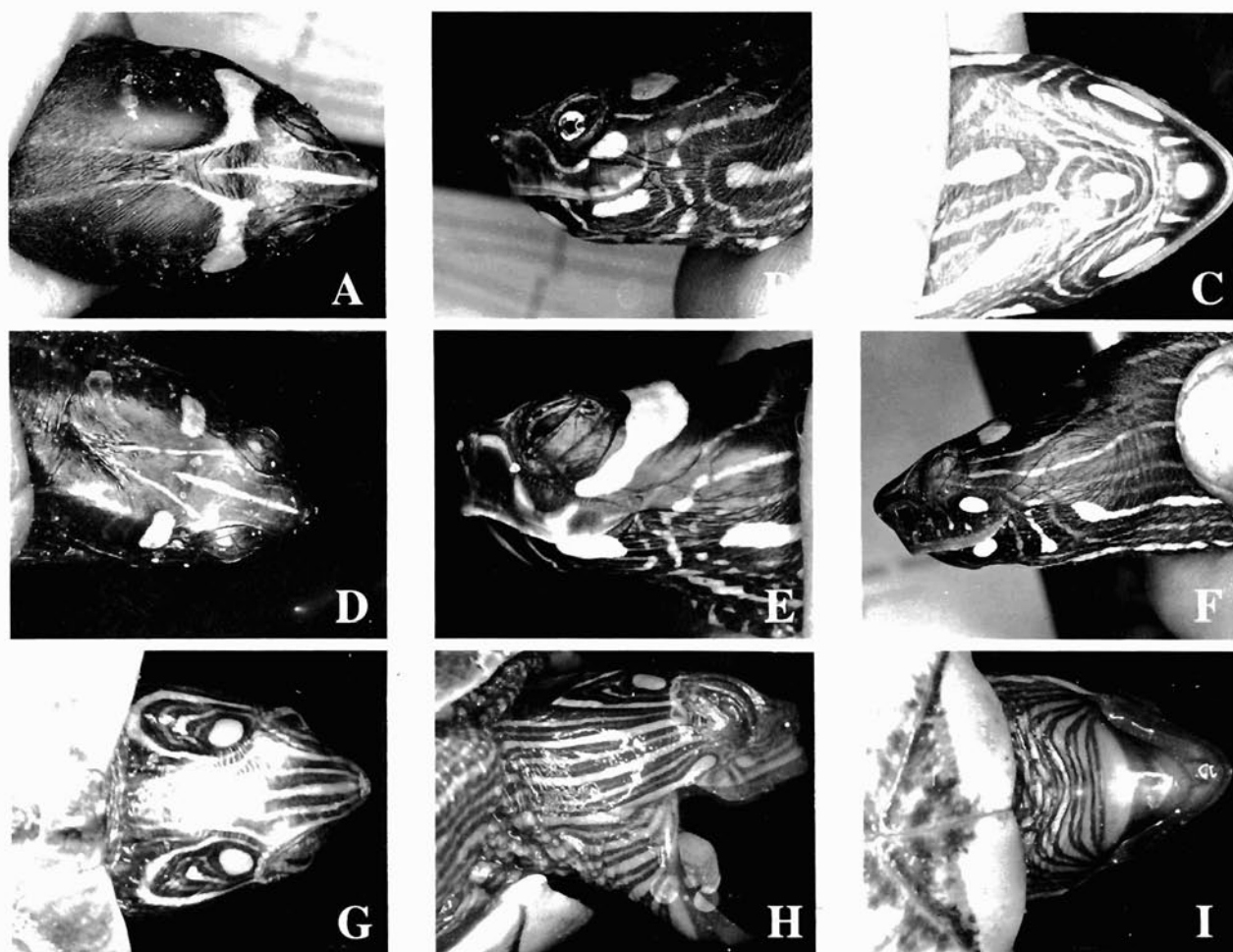


Figure. Head views of *Graptemys ouachitensis ouachitensis* (A-F) from Stoddard, Mississippi River, Vernon County, Wisconsin, and *G. o. sabinensis* (UMMZ 104356) (G-I) from 8 mi. SW Negreet, Sabine Parish, Louisiana.

Malaclemys pseudogeographica ouachitensis: Cochran and Goin, 1970:149.

Graptemys ouachitensis ouachitensis: Vogt, 1980a:17. First use of present combination.

• **Definition.** The carapace reaches a length of 260 mm, and is generally larger in the northern United States. The postorbital spot usually is large, rarely reduced, and never has narrow yellow rings around it. The postorbital spot may be enlarged and connected with the subocular spot to form a wide crescent. This is more common in northern populations than in southern populations. The underside of the head usually has four large spots, and is rarely crossbanded. The plastral pattern covers less than 75% of the shell and often is restricted to the sutures.

2. *Graptemys ouachitensis sabinensis* Cagle

Graptemys pseudogeographica sabinensis Cagle, 1953:2. Type-locality, "Sabine River, eight miles southwest of Negreet, Louisiana." Holotype, UMMZ 104351, a mature female, collected by A.H. Chaney and C.L. Smith, 5 July 1950 (examined by author).

Malaclemys pseudogeographica sabinensis: Cochran and Goin, 1970:149.

Graptemys ouachitensis sabinensis: Vogt, 1980a:17. First use of present combination.

• **Definition.** Smaller in carapace length compared to *G. o. ouachitensis*, males reach 106 mm in length and females 155 mm. The postorbital yellow marking is reduced to a spot in most individuals. Six to nine yellow lines contact the orbit on each side of the head. At least four of these lines are wide. The throat is marked with transverse alternating yellow and dark green bars. The central two thirds of the plastron is marked with yellow and dark green reticulations. The plastron of males is often flecked with black.

Literature Cited

- Anderson, P. 1965. The reptiles of Missouri. Univ. Missouri Press, Columbia.
- Behler, J.L. and F.W. King. 1979. The Audubon Society field guide to North American reptiles and amphibians. Alfred A. Knopf, New York.
- Black, J.H., J. Pigg, and R.L. Lardie. 1987. Distribution records of *Graptemys* in Oklahoma. Bull. Maryland Herpetol. Soc. 23:65-68.
- Bull, J.J. 1985. Sex ratio and nest temperature in turtles: comparing field and laboratory data. Ecology 66:1115-1122.
- and R.C. Vogt. 1979. Temperature-dependent sex determination in turtles. Science 206:1186-1188.
- and —. 1981. Temperature-sensitive periods of sex determination in emydid turtles. J. Exp. Zool. 218:435-440.
- , —, and C.J. McCoy. 1982a. Sex determining temperatures in turtles: a geographic comparison. Evolution 36:326-332.
- , —, and M.G. Bulmer. 1982b. Heritability of sex ratio in turtles with environmental sex determination. Evolution 36:333-341.
- , T. Wibbels, and D. Crews. 1990. Sex determining potencies vary among female incubation temperatures in a turtle. J. Exp. Zool. 256:339-341.
- Cagle, F.R. 1953. Two new subspecies of *Graptemys pseudogeographica*. Occ. Pap. Mus. Zool. Univ. Michigan (546): 1-17.
- Carpenter, C.C. 1955. The amphibians and reptiles of the University of Oklahoma Biological Station area in south central Oklahoma. Proc. Oklahoma Acad. Sci. 36:39-46.
- Carr, A.F. 1949. The identity of *Malacoclemmys kohnii* Baur. Herpetologica 5:9-10.
- . 1952. Handbook of turtles. The turtles of the United States, Canada, and Baja California. Cornell Univ. Press, Ithaca, New York.
- Clarke, R.F. 1956. Distributional notes on some amphibians and reptiles of Kansas. Trans. Kansas Acad. Sci. 59:213-219.
- , J. Breukelman, and T.F. Andrews. 1958. An annotated checklist of the vertebrates of Lyon County, Kansas. Trans. Kansas Acad. Sci. 61:165-194.
- Cochran, D.M. and C.J. Goin. 1970. The new field book of reptiles and amphibians. G.P. Putnam's Sons, New York.
- Collins, J.T. 1993. Amphibians and reptiles in Kansas. 3rd ed. Univ. Kansas Mus. Nat. Hist. Publ. Educ. Ser. (13). Lawrence, Kansas.
- Conant, R. 1975. Field guide to the reptiles and amphibians of eastern and central North America. Houghton Mifflin Co., Boston, Massachusetts.
- and J.T. Collins. 1991. A field guide to reptiles and amphibians, eastern and central North America. 3rd ed. Houghton Mifflin Co., Boston, Massachusetts.
- Congdon, J.D., D.W. Tinkle, and P.C. Rosen. 1983. Egg components and utilization during development in aquatic turtles. Copeia 1983:264-268.
- Dixon, J.R. 1960. Epizootic algae on some turtles of Texas and Mexico. Texas J. Sci. 12:36-38.
- . 1987. Amphibians and reptiles of Texas with keys, taxonomic synopses, bibliography, and distribution maps. Texas A&M Univ. Press, College Station.
- Dundee, H.A. 1974. Evidence for specific status of *Graptemys kohnii* and *Graptemys pseudogeographica*. Copeia 1974: 540-542.
- and D.A. Rossman. 1989. The amphibians and reptiles of Louisiana. Louisiana State Univ. Press, Baton Rouge.
- Ernst, C.H. 1974. Observations on the courtship of male *G. pseudogeographica*. J. Herpetol. 8:377-378.
- and R.W. Barbour. 1972. Turtles of the United States. Univ. Press Kentucky, Lexington.
- and —. 1989. Turtles of the world. Smithsonian Inst. Press, Washington, D.C.
- and E.M. Ernst. 1979. Synopsis of protozoans parasitic in native turtles of the United States. Bull. Maryland Herpetol. Soc. 15:1-15.
- , J.E. Lovich, and R.W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Inst. Press, Washington, D.C. and London.
- Ernst, E.M. and C.H. Ernst. 1977. Synopsis of helminths parasitic in native turtles of the United States. Bull. Maryland Herpetol. Soc. 13:1-75.
- Ewert, M.A. 1979a. Geographic distribution: *Graptemys pseudogeographica ouachitensis*. Herpetol. Rev. 10:102.
- . 1979b. The embryo and its egg: development and natural history, p. 333-413. In M. Harless and H. Morlock (eds.), Turtles: perspectives and research. John Wiley and Sons, New York.
- . 1985. Embryology of turtles, p. 75-267. In C. Gans, F. Billet, and P.F.A. Maderson (eds.), Biology of the Reptilia. Vol. 14. Development A. John Wiley and Sons, New York.
- and C.E. Nelson. 1991. Sex determination in turtles: diverse patterns and some possible adaptive values. Copeia 1991: 50-69.
- Forbes, W.C. 1966. A cytological study of the Chelonia. Ph.D. Diss., Univ. Connecticut, Storrs.
- Fuselier, L. and D. Edds. 1994. Habitat partitioning among three sympatric species of map turtles, genus *Graptemys*. J. Herpetol. 28:154-158.
- George, S.G., J. Killgore, and S.L. Harrel. 1995. Geographic distribution: *Graptemys pseudogeographica ouachitensis*. Herpetol. Rev. 26:43.

- Harvey, M.B. 1992. The distribution of *Graptemys pseudogeographica* on the upper Sabine River. Texas J. Sci. 44:257-258.
- Haynes, D. and R.R. McKown. 1974. A new species of map turtle (genus *Graptemys*) from the Guadalupe River system in Texas. Tulane Stud. Zool. 18:143-152.
- Holman, J.A. 1988. The status of Michigan's Pleistocene herpetofauna. Michigan Acad. 20:125-132.
- Hutchison, V.H., A. Vinegar, and R.J. Kosh. 1966. Critical thermal maxima in turtles. Herpetologica 22:32-41.
- Iverson, J.B. 1992a. A revised checklist with distribution maps of the turtles of the world. Priv. printed, Paust Printing, Richmond, Indiana.
- . 1992b. Correlates of reproductive output in turtles (order Testudines). Herpetol. Monogr. (6):25-42.
- Janzen, F.J., G.L. Paukstis, and E.D. Brodie III. 1992. Observations on basking behavior of hatchling turtles in the wild. J. Herpetol. 26:217-219.
- Jenkins, J.D. 1979. Notes on the courtship of the map turtle *Graptemys pseudogeographica* (Gray) (Reptilia, Testudines, Emydidae). J. Herpetol. 13:129-131.
- Johnson, T.R. 1987. The amphibians and reptiles of Missouri. Missouri Dept. Conser., Jefferson City.
- Killebrew, F.C. 1977. Mitotic chromosomes of turtles. IV. The Emydidae. Texas J. Sci. 29:245-253.
- Lamb, T., C. Lydeard, R.B. Walker, and J.W. Gibbons. 1994. Molecular systematics of map turtles (*Graptemys*): a comparison of mitochondrial restriction site versus sequence data. Syst. Biol. 43:543-559.
- Lindeman, P.V. 1993. Aerial basking by hatchling freshwater turtles. Herpetol. Rev. 24:84-87.
- McKown, R.R. 1972. Phylogenetic relationships within the turtle genera *Graptemys* and *Malaclemmys*. Ph.D. Diss., Univ. Texas, Austin.
- Minton, S.A., Jr. 1972. Amphibians and reptiles of Indiana. Indiana Acad. Sci. Mongr. (3):1-346.
- Moll, D. 1976a. Food and feeding strategies of the Ouachita Map Turtle (*Graptemys pseudogeographica ouachitensis*). Amer. Midl. Nat. 96:478-482.
- . 1976b. Environmental influence on growth rate in the Ouachita Map Turtle, *Graptemys pseudogeographica ouachitensis*. Herpetologica 32:439-443.
- Mount, R. 1975. The amphibians and reptiles of Alabama. Auburn Univ. Agric. Exp. Station. Auburn, Alabama.
- Oldfield, B. and J.J. Moriarty. 1994. Amphibians and reptiles native to Minnesota. Univ. Minnesota Press, Minneapolis.
- Pritchard, P.C.H. 1967. Living turtles of the world. T.F.H. Publ., Inc., Jersey City, New Jersey.
- . 1979. Encyclopedia of turtles. T.F.H. Publ., Inc., Neptune, New Jersey.
- Proctor, V.W. 1958. The growth of *Basiacladia* on turtles. Ecology 39:634-645.
- Richmond, N.D. 1953. The False Map Turtle; a new addition to the fauna of West Virginia. Proc. West Virginia Acad. Sci. 25:35.
- Shively, S.H. and J.F. Jackson. 1985. Factors limiting the upstream distribution of the Sabine Map Turtle. Amer. Midl. Nat. 114:292-303.
- Slaughter, B.H., W.W. Crook, Jr., R.K. Harris, D.C. Allen, and M. Seifert. 1962. The Hill-Shuler local faunas of the upper Trinity River, Dallas and Denton counties, Texas. Univ. Texas Bur. Econ. Geol., Rept. Invest. Report (48):1-75.
- Smith, H. M. 1956. Handbook of amphibians and reptiles of Kansas. Univ. Kansas Mus. Nat. Hist., Misc. Publ. (9):1-356.
- Smith, P.W. 1961. The amphibians and reptiles of Illinois. Illinois Nat. Hist. Surv. Bull. 28:1-298.
- Snider, A.T. and J.K. Bowler. 1992. Longevity of reptiles and amphibians in North American collections. 2nd ed. SSAR Herpetol. Circ. (21):1-40.
- Sowerby, J. de C. and E. Lear. 1872. Tortoises, terrapins, and turtles drawn from life. Sothoran, Baer & Co., London, Paris, Frankfurt.
- Stovall, J.W. and W.N. McNulty. 1950. The vertebrate fauna and geologic age of Trinity River terraces in Henderson County, Texas. Amer. Midl. Nat. 44:211-250.
- Sullivan, B. and A. Riggs. 1967. Structure, function and evolution of turtle hemoglobins. II. Electrophoretic studies. Comp. Biochem. Physiol. 23:449-458.
- Tinkle, D.W. 1962. Variation in shell morphology of North American turtles. I. The carapacial seam arrangements. Tulane Stud. Zool. 9:331-349.
- Vogt, R.C. 1974. Systematics of the *Graptemys pseudogeographica* complex (abstr). Herpetol. Rev. 5:79.
- . 1979. Cleaning/feeding symbiosis between grackles (*Quiscalus*: Icteridae) and map turtles (*Graptemys*: Emydidae). Auk 96:608-609.
- . 1980a. Natural history of the map turtles *Graptemys pseudogeographica* and *Graptemys ouachitensis* in Wisconsin. Tulane Stud. Zool. 22:17-48.
- . 1980b. New methods for trapping aquatic turtles. Copeia 1980:368-371.
- . 1981a. Natural history of amphibians and reptiles in Wisconsin. Milwaukee Pub. Mus., Milwaukee, Wisconsin.
- . 1981b. Turtle egg (*Graptemys*: Emydidae) infestation by fly larvae. Copeia 1981:457-459.
- . 1981c. Food partitioning in three sympatric species of map turtle, genus *Graptemys* (Testudinata, Emydidae). Amer. Midl. Nat. 105:102-111.
- . 1993. Systematics of the false map turtles (*Graptemys pseudogeographica* complex: Reptilia, Testudines, Emydidae). Ann. Carnegie Mus. 62:1-46.
- and J.J. Bull. 1982. Temperature controlled sex-determination in turtles: ecological and behavioral aspects. Herpetologica 38:156-164.
- and —. 1984. Ecology of hatchling sex ratio in map turtles. Ecology 65:582-587.
- Webb, R.G. 1961. Observations on the life histories of turtles (genus: *Pseudemys* and *Graptemys*) in Lake Texoma, Oklahoma. Amer. Midl. Nat. 65:193-214.
- . 1970. Reptiles of Oklahoma. Univ. Oklahoma Press, Norman.
- Wilson, R.L. and G.P. Zug. 1966. A fossil map turtle (*Graptemys pseudogeographica*) from central Michigan. Copeia 1966:368-369.
- Zangerl, R. 1969. The turtle shell, p. 311-339. In C. Gans, C.A. d'A. Bellairs, and T.S. Parsons (eds.), Biology of the Reptilia. Vol. 1. Morphology A. Academic Press, London and New York.

Richard C. Vogt, Estación de Biología "Los Tuxtlas," UNAM, Apartado Postal 94, San Andrés Tuxtla, Veracruz, México C.P. 95700.

Primary editor for this account, Michael E. Seidel.

Published 22 December 1995 and Copyright © 1995 by the Society for the Study of Amphibians and Reptiles.
